DOCUMENT RESUME

ED 152 856 TM 007 125

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TITLE Development of a Perceptual-Motor Rating Scale for Classroom Teachers to Record Child Behavior.
PUB DATE 17 Feb 78
NOTE 35p.; Paper presented at the Annual Meeting of the American Educational Research Association (62nd, Toronto, Ontario, Canada, March 27-31, 1978)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Adapted Physical Education; Behavior Rating Scales; *Classroom Observation Techniques; Compensatory Education Programs; Diagnostic Tests; Factor Analysis; Mainstreaming; *Perceptually Handicapped; *Perceptual Motor Learning; Primary Education; *Program Effectiveness; Psychomotor Skills; *Rating Scales; Scoring; *Test Construction; Test Reliability; Test Validity
IDENTIFIERS Cleveland Public Schools OH; *Perceptual Motor Rating Scale

ABSTRACT

The ability of the Perceptual-Motor-Rating Scale to indicate changes in regular classroom performance resulting from individualized perceptual-motor training by physical education specialists was statistically analyzed. Efforts were made to identify factors, confirm their independence, optimize scoring procedures and assess reliability. Preliminary statistical analyses of pre-post test results yielded four factors; and for 344 first graders, several significant differences between project and control schools, and among classes. Additional analyses of results for 601 children (grades one through three) confirmed the emergence of these four independent factors when full loadings on all items were used, regardless of magnitude; the independence of factors vanished, however, with two attempts at single-digit item loadings--perhaps because several items loaded heavily on more than one factor. Further investigation of the reliability and validity for project evaluation of a global score has been planned. This should make quantification of observable changes in children's behavior less computer-dependent and, thus, the instrument should become more usable. The scale itself and a history of the program for which it was developed, the Perceptual-Motor Development Project, are appended. (Author/CP)

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DEVELOPMENT OF A PERCEPTUAL-MOTOR RATING SCALE FOR CLASSROOM TEACHERS TO RECORD CHILD BEHAVIOR

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FEBRUARY 17, 1978

(PRINTED IN U.S.A.)

AERA Session 16.22
(March 29, 1978)

TM007 125

DEVELOPMENT OF A PERCEPTUAL-MOTOR RATING SCALE

FOR CLASSROOM TEACHERS TO RECORD CHILD BEHAVIOR

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DEVELOPMENT OF A PERCEPTUAL-MOTOR RATING SCALE FOR CLASSROOM TEACHERS TO RECORD CHILD BEHAVIOR

BACKGROUND

In relation to the evaluation of the Perceptual-Motor Development Project (described briefly in Attachment A) funded under Disadvantaged Pupil Programs Funds, an instrument was needed for assessing the effects of remedial perceptual-motor training (provided primarily by the physical education specialist at three of the four project schools) upon children's capacity to function effectively in the "regular" classroom setting. Project staff--along with the evaluator assigned to the project and the supervisor responsible for its management since its inception in the fall of 1972--undertook during 1975-1976 the development of a perceptual-motor, child-observation rating scale appropriate for classroom teachers' use, i.e., incorporating relevant behaviors which teachers could observe in the typical school classroom, described in "teacher" rather than "physical education specialist" language.

The need for developing such an instrument locally was based on three years of experience with the project and a search of the literature. Children in participating grades/schools were screened for perceptual-motor deficiencies. A more extensive diagnostic measure was administered in the fall and spring to children needing special help, who had been randomly assigned to experimental (special training) or control (regular program) status. Each year, experimental students evidenced significantly greater gains than control groups on some or all subtests of this diagnostic measure in most project schools.

Scores on this measure, however, could not reflect changes in children's general academic functioning in the "regular" school setting, and the literature search yielded no appropriate instrument for classroom teachers to use for recording their observations of students' performance. Most reports reiterated the theoretical relationships of perceptual-motor skills and academic achievement, or focused on activities/programs in perceptual-motor areas. The scant empirical evidence on these theoretical relationships presented an inconclusive picture, and no instrument appropriate for project use with classroom teachers was discovered.

Teachers whose children were being served by the project had been reporting over the years that, before the screening test was administered, they usually could identify those children who needed help in perceptual-motor skills. The physical education specialist and aide at one of the project schools, in consultation with all involved with the project, systematically collected from classroom teachers child behaviors they had observed which indicated children's needs for perceptual-motor training. These were compiled into a preliminary version which a few teachers completed on a few children. Revisions were made; the list of behaviors was reduced to 28, and the format arranged for ease of data-processing. (See Attachment B.) To record observations of a child on the revised, one-page form, the teacher needed only to mark X in one of three columns to the right of each item, to indicate whether: "this is a real 'problem area' for the child"; "this is sometimes, but seldom, a problem for the child"; or, "this is now no problem for the child." This instrument was field-tested during 1976-1977 (a procedure which is being repeated during 1977-1978, with results again to be subjected to further statistical analyses).

PURPOSE

The purpose of the current study was to apply extensive statistical analyses to the results of the 1976-1977 field-test to appraise the value of the Scale for indicating changes in children's "regular classroom" performance which may be related to their having had special perceptual-motor training. These analyses included efforts to identify factors, confirm their independence, optimize scoring procedures and assess the reliability of the scores.

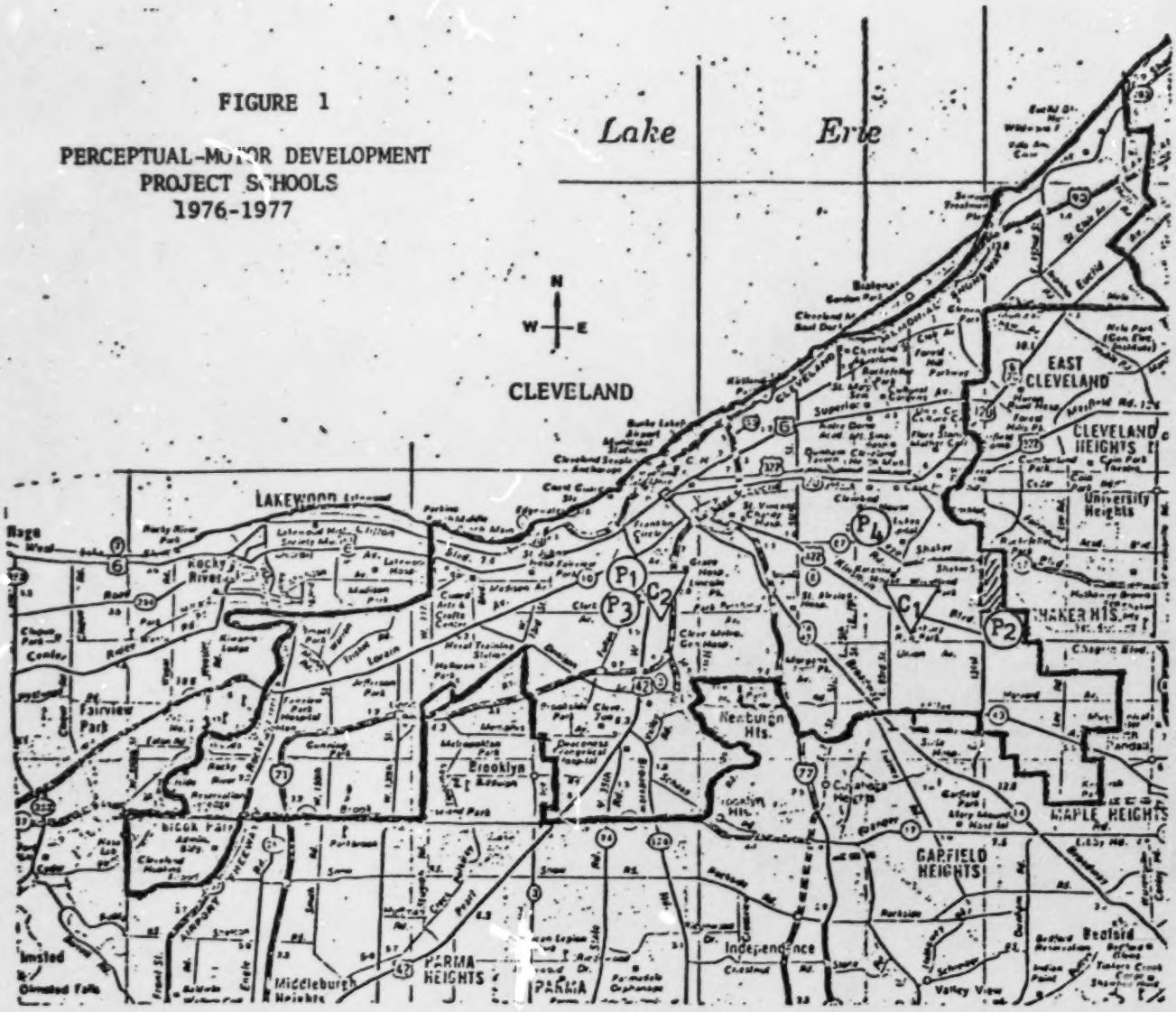
FIELD-TEST POPULATION

The project schools are a sample of Cleveland Public Schools, but in no way a random or representative one. This is necessitated first by eligibility for Disadvantaged Pupil Program Funds support for the project (approximately $31,000 per annum), as well as the school staffs' and physical education specialists' commitments to project goals. All but one of the six schools remains above-average in per cent of children on welfare, and all but one (other) is above-average in mobility rate (transfers/withdrawals in relation to enrollment)--as shown by data presented in Attachment C.

The student-population intended to participate in field-testing the Perceptual-Motor Rating Scale was identical to that of the Perceptual-Motor Development Project. These were primary-grade pupils in four project and two control schools, approximate locations of which have been shown in Figure 1 on the following page. In two project schools children in grades one, two and three participated; in the other four schools, only first-graders were involved (as enumerated in Figure 2 on page 5). Due to unforeseeable circumstances, children in one of the project schools (P_4) could not be rated by their classroom teachers, so that the total potential

FIGURE 1

PERCEPTUAL-MOTOR DEVELOPMENT
PROJECT SCHOOLS
1976-1977



- - - Cleveland City School District (where different from city boundary)

(P) Project School (approximate location)

(C) Control School

FIGURE 2

PERCEPTUAL-MOTOR DEVELOPMENT PROJECT SCHOOLS: 1976-1977

ENROLLMENTS (5/27/77) AND APPROXIMATE
PERCENTAGES OF PUPILS SERVED
(IN PARENTHESES)

	SCHOOL AND MAP CODE*	ENROLLMENT AND PUPILS SERVED						
		GRADE 1	GRADE 1/2	GRADE 2	GRADE 2/3	GRADE 3	TOTAL	
PROJECT	# 451 (P_1)	60 (33%)	22 (19%)	32 (21%)	29 (32%)	30 (23%)	173 (27%)	638 (26%)
PROJECT	# 486 (P_2)	94 (33%)	31 (26%)	73 (14%)	---	75 (11%)	273 (21%)	
PROJECT	# 560 (P_3)	111 (17%)**	---	---	---	---	111 (17%)	
PROJECT	# 584 (P_4)	81 (47%)	---	---	---	---	81 (47%)	
CONTROL	# 400 (C_1)	118 (NA)	---	---	---	---	118 (NA)	184 (NA)
CONTROL	# 500 (C_2)	66 (NA)	---	---	---	---	66 (NA)	

* The map code (P_1, C_2, etc.) refers to Figure 1 on page 4.

** In this project school, because the classroom teachers provide the perceptual-motor trainin actually <u>all</u> students were served--with special help for the 17% indicated above.

pupil population involved in field-testing of the instrument totaled 557 project- and 184 control-students (with complete data for 601).

The classroom teacher-population involved in utilizing the scale on a pre-post basis totaled 17. These teachers in three project-schools and two control-schools participated, as shown in Figure 3. These included all teachers of the grades involved in the respective schools served by the project, with the exception of two at one school (P_4), as noted above.

PROCEDURE

During October, 1976 teachers in three project schools and two comparable control schools (described in the preceding section) completed the rating Scale for each of their students. In May, 1977 these teachers again completed the Scale for students still enrolled. Pre-post ratings were collected for a total of 601 children and analyzed by the Division of Research and Development, as detailed below.

Initial Scoring

As indicated earlier (page 2), the teachers merely marked X in the appropriate column beside each item on the copy of the Scale for each child. As is evident from the sample copy (Attachment B), numeric values 1, 2 or 3 were assigned, respectively, to: OK (now no problem for the child), ?? (sometimes, but seldom, a problem), or PR (a real 'problem area' for the child). Following the post-rating in May, 1977 the post- and pre-rating sheets for each child were stapled, and responses--along with identification information--were keypunched.

Factor Identification

The first task was to determine whether or not the responses to these 28 items would produce identifiable factors. A complete correlation

FIGURE 3

PERCEPTUAL-MOTOR DEVELOPMENT PROJECT TEACHERS: 1976-1977

	SCHOOL AND MAP CODE	NUMBER OF TEACHERS USING SCALE					
		GRADE 1	GRADE 1/2	GRADE 2	GRADE 2/3	GRADE 3	TOTAL
PROJECT	# 451 (P_1)	2	1	1	1	1	17
	# 486 (P_2)	3	1	2	---	2	
	# 560 (P_3)	3	---	---	---	---	
	# 584 (P_4)	NA	---	---	---	---	
CONTROL	# 400 (C_1)	3	---	---	---	---	6
	# 500 (C_2)	3	---	---	---	---	

matrix of item reponses was generated. Using the SPSS* programs, the search for factors was initiated. Three methods were employed:

- principal components;
- principal components with iterative determination of communalities;
- alpha factoring.

(Detailed discussion of these procedures is readily available.**)

With each of the factoring methods, the factor solution was rotated using a Varimax criterion, to enhance the identifiability of the factors while maintaining factor independence. All three methods yielded essentially identical results. The "principal components with iterations" solution provided the most clearly defined factors.

Four eigenvalues of 1.0 or greater were found. The factors corresponding to these eigenvalues produced the factor matrices presented in Figure 4 (unrotated) and Figure 5 (rotated). Examination of the items with significant loadings on each factor made possible the following factor descriptions:

1 - organization of work, perception, following directions;

2 - self-sufficienty, self-confidence;

3 - eye-hand, small-muscle coordination (cutting, pasting, etc.);

4 - body movement, agility, gross motor control.

A few of the individual items loaded significantly on more than one factor. For descriptive purposes, each item was included with the factor upon which its loading was greatest. For all computational aspects,

---

* SPSSH Release 6.03, available from: SPSS, Inc., East Wacker Drive, Chicago, Illinois.

** Norman H. Nie, et al., SPSS: Statistical Package for the Social Sciences (Second Edition). New York: McGraw-Hill, 1975

FIGURE 4

CLEVELAND PUBLIC SCHOOLS
DPPF PERCEPTUAL-MOTOR DEVELOPMENT PROJECT: 1976-77
FILE PMD FALL 1976 RATINGS

FACTOR MATRIX USING PRINCIPAL FACTOR WITH ITERATIONS (UNROTATED)

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
V1	.62615	.47056	.06134	.30752
V2	.63676	.51679	.08453	.36767
V3	.63985	.52248	.07834	.30209
V4	.71630	.16784	-.08862	.14025
V5	.78458	.21581	-.15310	-.10361
V6	.81695	-.00068	-.22221	-.11315
V7	.84437	.01552	-.28459	-.13143
V8	.79172	.15143	-.38372	-.15567
V9	.78447	.12965	-.41886	-.14528
V10	.72641	.31052	-.01043	-.17359
V11	.71020	.31482	.02642	-.10471
V12	.76040	-.20755	-.13040	.13075
V13	.71283	-.33406	-.01140	.32500
V14	.74990	-.33314	.00481	.25295
V15	.69291	-.33577	.05556	.02960
V16	.75947	-.20009	.03633	.15049
V17	.71120	-.11963	-.01372	-.07329
V18	.77101	-.30750	.07530	-.01070
V19	.76702	-.35454	.05405	.15230
V20	.78655	-.26587	.05954	-.00969
V21	.72866	-.03769	-.06761	-.25859
V22	.78601	-.03525	.04373	-.22171
V23	.75898	-.00880	.34994	-.15050
V24	.78364	.06833	.36629	-.19242
V25	.74693	.08828	.35737	-.15510
V26	.52630	.10654	.36769	-.22275
V27	.78096	-.30569	-.01776	.12010
V28	.58103	.04779	.00161	.11108

FIGURE 5

CLEVELAND PUBLIC SCHOOLS
DPPF PERCEPTUAL-MOTOR DEVELOPMENT PROJECT: 1976-77
FILE PMD FALL 1976 RATINGS

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
V13	.79524	.09781	.15892	.24133
V14	.78955	.16425	.20069	.21610
V19	.77587	.25853	.21851	.15356
V27	.73797	.23549	.29976	.16787
V18	.68279	.36729	.29112	.09451
V15	.66938	.29443	.24042	.06527
V16	.66495	.25927	.25690	.25579
V20	.66425	.36656	.31741	.12897
V12	.66148	.15024	.38079	.22418
V17	.49244	.32991	.38687	.15707
V28	.36984	.20227	.25449	.33129
V24	.36571	.71624	.25203	.28231
V25	.34389	.67582	.22562	.30259
V23	.41932	.66346	.21649	.24160
V26	.16877	.62414	.14022	.18832
V22	.42365	.49172	.47101	.16431
V9	.33605	.13631	.78613	.28150
V8	.32191	.17239	.77447	.29675
V7	.45750	.23963	.69583	.24610
V6	.45928	.26076	.62687	.24019
V5	.29587	.31292	.59871	.39040
V21	.37453	.40633	.53553	.10789
V10	.16919	.43636	.52060	.40531
V11	.18344	.41925	.45524	.44552
V2	.18509	.19694	.19389	.83918
V3	.15747	.22946	.23158	.80543
V1	.18641	.20308	.22398	.76529
V4	.38213	.19393	.39554	.47822

item loadings on each factor were used, regardless of magnitude. The factor-score coefficient matrix was generated, and factor scores were produced for all individuals rated.

The factor-score correlation matrix was computed to assess the independence of the factors. These correlation coefficients based on pre-ratings, as shown in Figure 6, were not statitistically significantly different from zero, thereby establishing factor independence. Following the rerating of students in May (1977), results were again factor-analyzed to determine whether or not the same factor structure was evident. With the exception of five items--the original loadings of which were dispersed across factors--this factor structure remained essentially unaltered, as shown in Figure 7.

Reliability

Correlations between pre- and post- factor scores ranged from .16 to .42 for the 601 students (project and control). Since selected students in project schools had received special perceptual-motor training during the months between the pre- and post-ratings, this range of correlations is not surprising.

Typical procedures for assessing the reliability of an instrument--Kuder-Richardson, alpha coefficients, etc.--are not appropriate for weighted measures such as the factor scores on this Scale. Any estimates of reliability must, therefore, be inferred from such statistics as inter-item and item/factor-score correlations--shown in Figure 8 (pages 14-17). The fact that the items within each cluster (factor) are so highly correlated indicates a more than adequate level of reliability for the factor scores.

FIGURE 6

FACTOR CORRELATION MATRIX*

FACTOR	I	II	III	IV
I - Organization of work, perception, following directions	---			
II - Self-sufficiency, self-confidence	.070	---		
III - Eye-hand, small-muscle coordination (cutting, pasting, etc.)	.083	-.003	---	
IV - Body movement, agility, gross motor control	.008	.010	.021	---

* Each factor score included all 28 items, with the actual score on each (1, 2, 3) weighted according to the "loadings" shown in Figure 4.

FIGURE 7

CLEVELAND PUBLIC SCHOOLS
DPPF PERCEPTUAL-MOTOR DEVELOPMENT PROJECT: 1976-77
FILE PMD2 SPRING 1977 RATINGS

VARIMAX ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
V13	.77460	.15995	.12990	.24910
V14	.85656	.24276	.16203	.17022
V19	.68193	.41373	.27665	.03261
V27	.78244	.27940	.20741	.17887
V18	.49967	.46812	.44698	-.00542
V15	.51558	.41497	.39419	.05336
V16	.44760	.40759	.46697	.30184
V20	.49229	.55964	.36514	-.00465
V12	.62826	.22320	.41349	.24878
V17	.37736	.43570	.50681	.18495
V28	.42844	.09117	.17659	.41787
V24	.32251	.73826	.25817	.30784
V25	.39470	.60634	.16834	.31403
V23	.14883	.73837	.26502	.23594
V26	.17093	.61760	.32687	.26620
V22	.23344	.40793	.64075	.20001
V9	.35654	.20437	.80920	.25478
V8	.34046	.16737	.80135	.27752
V7	.42243	.24964	.67703	.24624
V6	.49533	.20076	.57888	.16872
V5	.14530	.18568	.69678	.38529
V21	.25567	.39538	.56195	.26776
V10	.05728	.31328	.65401	.47338
V11	.09086	.25837	.63021	.44083
V2	.20096	.17849	.30254	.85713
V3	.18891	.21340	.32353	.73703
V1	.13761	.16759	.26770	.86356
V4	.20383	.28670	.50915	.46309

NOTE: ( ) = Item for which major factor-loading on post-rating was different from that on the pre-rating (Figure 5).

FIGURE 8-a

DPPF PERCEPTUAL-MOTOR DEVELOPMENT PROJECT: 1976-1977
ITEM AND ITEM-FACTOR CORRELATIONS

FACTOR 1

ITEM	12	13	14	15	16	17	18	19	20	27	28
12	---										
13	.670	---									
14	.747	.812	---								
15	.556	.600	.613	---							
16	.688	.635	.640	.671	---						
17	.517	.520	.450	.675	.597	---					
18	.620	.602	.640	.670	.637	.606	---				
19	.649	.693	.677	.653	.726	.581	.774	---			
20	.606	.602	.630	.664	.667	.612	.802	.749	---		
27	.748	.724	.785	.584	.638	.527	.647	.708	.647	---	
28	.411	.489	.446	.372	.484	.403	.422	.421	.423	.483	---
TOTAL	.727	.857	.855	.730	.729	.553	.746	.838	.728	.805	.421

FIGURE 8-b

DPPF PERCEPTUAL-MOTOR DEVELOPMENT PROJECT: 1976-1977
ITEM AND ITEM-FACTOR CORRELATIONS

FACTOR 2

ITEM	22	23	24	25	26
22	---				
23	.636	---			
24	.635	.817	---		
25	.619	.727	.780	---	
26	.452	.587	.618	.600	---
TOTAL	.517	.713	.771	.727	.672

FIGURE 8-c

DPPF PERCEPTUAL-MOTOR DEVELOPMENT PROJECT: 1976-1977
ITEM AND ITEM FACTOR CORRELATIONS

FACTOR 3

ITEM	5	6	7	8	9	10	11	21
5	---							
6	.715	---						
7	.711	.820	---					
8	.710	.733	.800	---				
9	.684	.737	.822	.919	---			
10	.646	.622	.632	.634	.619	---		
11	.604	.571	.607	.597	.578	.828	---	
21	.630	.608	.631	.612	.605	.561	.525	---
TOTAL	.637	.670	.744	.828	.841	.548	.479	.566

FIGURE 8-d

DPPF PERCEPTUAL-MOTOR DEVELOPMENT PROJECT: 1976-1977
ITEM AND ITEM-FACTOR CORRELATIONS

FACTOR 4

ITEM	1	2	3	4
1	---			
2	.769	---		
3	.732	.829	---	
4	.568	.590	.628	---
TOTAL	.792	.875	.841	.479

Validity

Because teachers who had been involved with the project over the years provided the content of the Scale items (indicated earlier, on page two), face validity of the Scale may be assumed. Furthermore, the fact that Scale scores reflect pre-post changes in children's behavior observed by their "regular" classroom teachers (as substantiated in the next section of this report)--related to, whether or not caused by, project participation--supports the Scale's validity as an instrument for project evaluation. Procedures implemented for analyzing the data in this light are detailed subsequently.

Utilization for Project Evaluation

One project objective for 1976-1977, as indicated earlier, was field-testing the locally designed Scale. For purposes of the annual evaluation report, a multivariate analysis* of the factor scores for 344 first-grade children in three project and two control schools was performed. This analysis was conducted using the post-rating scores as dependent variables with the pre-rating scores as covariates, to provide a measure of change. Results of this analysis--involving a 2 x 5 x 3 nested design--have been summarized in Figures 9 and 10.

Though lacking the refinement of differentiating within project schools between children who were, or were not, designated for special perceptual-motor training (because of inadvertent loss of linkage between pupils' names and scores), this analytic design was selected for several reasons. The project manager and evaluator had observed that, although

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* "Multivariance: Univariate and Multivariate Analysis of Variance Covariance and Regression--Version 5.3," distributed by International Educational Services, P.O. Box A 3650, Chicago, Illinois, 60690.

FIGURE 9

PERCEPTUAL-MOTOR DEVELOPMENT PROJECT: 1976-1977

SUMMARY OF MULTIVARIATE ANCOVA

	Hypothesis df	F	F-test df	Probability
Project (P) x Control (C)	1	7.1696	4 + 323	<.0001
School(S)/P	2	10.6162	8 + 646	<.0001
School(S)/C	1	6.2525	4 + 323	<.0001
Class/S1/P	1	1.4624	4 + 323	<.2134
Class/S2/P	2	1.0520	8 + 646	<.3954
Class/S3/P	2	1.1460	8 + 646	<.3302
Class/S1/C	2	9.6083	8 + 646	<.0001
Class/S2/C	2	4.0192	8 + 646	<.0002

NOTE: The slash mark "/" denotes that the prior variable is nested within the variable following the mark.

FIGURE 10

PERCEPTUAL-MOTOR DEVELOPMENT PROJECT: 1976-1977

ADJUSTED CELL AND COMBINED MEANS*
(GRADE ONE: N = 344)

IDENTIFICATION	N	FACTOR 1	2	3	4
PROJECT	193	-.47	-.20	-.25	-.09
School 1	44	-.36	-.19	.12	.07
Class A	25	-.12	-.04	-.02	-.07
Class B	19	-.48	-.26	-.20	-.14
School 2	80	.28	.06	-.21	-.15
Class A	27	.37	.10	-.03	-.11
Class B	27	.29	.16	-.47	-.17
Class C	26	.19	-.08	-.15	-.17
School 3	69	-.76	-.29	-.39	-.12
Class A	21	-.53	-.17	-.51	-.17
Class B	22	-.87	-.27	-.44	-.03
Class C	26	-.88	-.44	-.22	-.23
CONTROL	151	-.28	.11	-.08	-.21
School 1	100	.14	.12	.13	.04
Class A	33	-.50	.51	.60	.47
Class B	33	.02	-.41	.03	-.23
Class C	34	-.11	.27	-.25	-.11
School 2	51	-.38	.11	-.13	-.27
Class A	17	-.08	.28	.25	-.26
Class B	18	-.45	-.35	-.41	-.46
Class C	16	-.61	.39	-.23	-.10

* Negative values represent higher levels of perceptual-motor development, as indicated under "Initial Scoring," page 6.

the two original "treatment-patterns" (described in Attachment A) were fairly discrete during the early years of the project, one of the original project schools had been replaced and in every school (in spite of relatively stable staffing) a rather individualized pattern had evolved at each. Furthermore, DPPF administrators have long been encouraging site-by-site evaluation. Under these circumstances, the design selected seemed most appropriate for optimally capitalizing upon available information to assess the usability and value of the Scale.

This analysis yielded several interesting findings. These included:

- significantly ($p < .02$) greater pre-post improvements in project schools, in comparison with control schools on factors numbered 1, 2 and 3;
- significant ($p < .03$) differences among project schools on these same three factors;
- significant ($p < .02$) differences between the two control schools on factors numbered 1 and 4;
- significant ($p < .01$) differences among classes on all four factors at one control school and on factors numbered 2 and 3 at the other;
- no significant differences on any of the factors among classes at any of the project schools.

Regardless of the variety of possible causes for these outcomes, they indicated the potential utility of the brief, locally developed Scale for appraising effectiveness of project "treatment."

Simplification of Scoring

Calculating four factor scores per child using the full five-digit loadings (Figure 5) proved no great problem because of the availability of computers and programs, along with sufficient human expertise within the Division of Research and Development staff. It seemed desirable,

however--and still does--to develop an arithmetically less cumbersome scoring procedure, for use of the Scale with this project and by others who might be "computer-less."

Several possibilities were--and will be--considered. Two attempts at single-digit item loading have proved inadequate. Like the oversimplified 0-1-2 loadings, those of single digits but greater range--one significant digit based on the full loadings (Figure 5)--have proved unsatisfactory. On the pre-ratings for the 601 children whose data have been reported above, the correlations of factor-scores computed by single-digit loading with those computed by five-digit loadings ranged from .5246 on Factor 4 to .8052 on Factor 1; the independence of the factors, however, vanished--as shown below in Figure 11.

FIGURE 11

FACTOR CORRELATION MATRIX:
ITEMS SINGLE-DIGIT-LOADED
(PRE-RATING: N = 601)

FACTOR	1	2	3	4
1	---			
2	.9653	---		
3	.9620	.9597	---	
4	.9637	.9669	.9644	---

Time has not yet been available to analyze statistically the utility of a single total score for purposes of project evaluation. Several items have been demonstrated to load heavily on more than one factor, indicating the potential usefulness of a global score (total of 1-2-3 weights on items, according to teachers' markings) for quantifying

changes in children's performance in the "regular" classroom. (Use of such a score, if demonstrated adequate statistically, would remain consistent with project objectives, as long as those providing individualized perceptual-motor training utilized more sensitive diagnostic measures for identifying children's specific instructional needs.)

SUMMARY AND DISCUSSION OF FINDINGS

Major findings of this study have been interspersed throughout the preceding section. They have necessarily been inextricably intertwined with procedures, since the outcomes of the first procedure suggested the next to be attempted--and so on--in terms of assessing the properties and adequacy of a rather short, locally developed, easily used Scale for evaluation of project success each year. Thus far, analyses have demonstrated the presence of statistically independent perceptual-motor factors in terms of behaviors observable by--and defined in the language of--classroom teachers. Results of computer-dependent procedures employed to date have demonstrated the independence of these factors (while the disappearance of this independence with simplified scoring item-weighting may merely reflect the fact that the typical project participant is a "whole child"). The findings have indicated that application of a series of appropriate statistical analyses to the results of responses to a locally developed instrument can provide evidence of its reliability and validity.

CONCLUSIONS; FUTURE DIRECTIONS

The analyses to date of the results of the first project-wide field test of the classroom teachers' Perceptual-Motor Rating Scale have provided promising results. Independent factors have been identifiable--through analyses made feasible through computer accessibility. Findings have provided evidence of the reliability and validity of such a Scale for project evaluation--crucial, at this time when those providing supplementary services are expected to be "accountable" in terms of learners' performance in "regular" educational settings.

The shortcomings of the 1976-1977 field test may be partially overcome and the findings corroborated during the current school year. Treating as separate groups within project schools children who have received special perceptual-motor training and pupils who have not should make it possible more clearly to specify sources of variability in factor scores. Pursuing the adequacy of "simplified" factor and/or total scores may prove not only enlightening but also practical, particularly for potential users of the Scale who lack easy access to computers. Thus, this report should be considered "process oriented"--steps one may take along the way to develop locally a useful measure of the effectiveness of a compensatory educational program.

ATTACHMENT A

THE PERCEPTUAL-MOTOR DEVELOPMENT PROJECT

HISTORY

During the first year of the project (1972-1973), four project schools participated. (Three of these schools--as well as almost all the "original" teachers, physical education specialists and aides are still involved during 1977-1978.) Two patterns or plans of project operations were established, each followed by two of the schools. Both patterns included screening of all students in designated grades, plus more intensive, follow-up (pre-post) diagnostic testing of children identified during screening as "deficient" in one or more areas of perceptual-motor development. Both also included subsequent individual and small-group perceptual-motor instruction based on this diagnosis, as well as parent activities designed to inform them about the program and provide suggestions for their home-reinforcement efforts.

- In schools following Plan I, a physical education specialist was assigned to the project half-time, and a full-time educational aide was employed to work with the specialist. Children in grades one through three needing help were scheduled out of their regular classrooms for 15-30 minutes, once to three times a week, to work with specialist and aide on development of designated perceptual motor skills. Classroom teachers of participating pupils were inserviced by the elementary physical education supervisor (project manager), so they could provide reinforcement in the child's "regular" class.

- In schools following Plan II, only first-grade children were served, and perceptual-motor instruction was provided by the regular classroom teacher. The physical education specialist was employed by the project only to provide (with the assistance of the supervisor) after-school, on-site inservice to the first-grade teachers relevant to meeting individual children's diagnosed needs, working with parents, etc.

INSTRUCTIONAL EMPHASES

Project activities stressed are designed to provide opportunities for children to:

- develop a more positive self-concept;
- increase motor ability and perceptual performance;
- improve social and emotional adjustment.

These activities are planned according to individual children's needs/deficiencies in the following areas:

- Eye-Hand Coordination (the skillful working together of the hands and the eyes);
- Visual Perception (the ability to copy and identify letters, simple words, and similarities and differences in geometric figures);
- Rhythm Activities (ability to maintain gross and fine motor balance and coordination, and to move to a given rhythm);
- Fine-Motor Skills (the ability to coordinate the fine muscles so the child can initiate precise hand movements without difficulty);
- Body Awareness (awareness of the names, movements, functions and locations of the body parts and understanding that one side of the body is different from the other);
- Balance Activities (ability to maintain equilibrium and body control when moving or in a stationary position);
- Auditory Discrimination (ability to distinguish similarities and differences in the sounds heard);
- Gross Motor Movement (ability to control larger muscles of the body, involving such movement patterns as: walking, running, skipping and hopping).

UPDATE

As the project staff has remained extremely stable over the years, each school has "individualized" details of its operations, such as involving an opthalmologist as a volunteer resource person and having high-school or college students serve as volunteer aides. The need for intensive inservice has diminished greatly. Parent involvement has increased. Two project schools originally following Plan I (P_1 and P_2, in the body of this paper) have continued that pattern; a third (P_3) has maintained Plan II operations. The fourth school--new to the project in the fall of 1976, but having on its staff the physical education specialist who "got the whole thing started" as a summer-school pilot project at the school to which she was previously assigned--has its own pattern because of unforeseeable circumstances. At this site (P_4), the specialist alone implements all diagnostic, instructional and parent-oriented activities.

Several unexpected, but valuable, "spin offs" have come from this relatively small project. Its activities have been observed by educators representing suburban school systems, as well as several college/university students preparing to teach--and videotaped for instructing teachers and parents. Through the project's routine screening, the eye ailment that would have caused one child's blindness within a year was discovered "in time." The specialist and teachers at one project school--partly financed through a mini-grant from a local university--developed for classroom teachers' use a kit of materials and handbook of activities designed for promoting development of specified perceptual-motor skills; these have been tested, revised and are now utilized in all project schools. The specialist and aide at another

project school took the initiative in collecting from classroom teachers the descriptive information from which the Scale analyzed in this study was developed (as indicated earlier).

CONTACT

Anyone desiring further information about the Perceptual-Motor Development Project operations and materials should contact the project manager, whose address follows.

Miss Marilyn J. Fink, Supervisor
Elementary Physical Education
Cleveland Board of Education
1380 East Sixth Street
Cleveland, Ohio 44114

SCHOOL NO. _____ DATE _____ CHILD'S NAME _____
(Print last name and first initial.)

TEACHER'S NAME _____ SEX: (Circle.) M F BIRTHDATE _____
(month/day/year)

DO NOT WRITE IN THIS BOX.

1 2 3	4	5	6	7	8 9 10	11 12	13 14	15 16 17 18 19 20 21 22	23

INSTRUCTIONS: Be sure that all information has been provided in each of the spaces above the big box. Then, on the basis of your current observations of the child's typical behavior in your classroom, mark X in one the boxes to the right of every item, as follows:

PR - if this is a real "problem area" for the child;
?? - if this is sometimes, but seldom, a problem for the child;
OK - if this is now no problem for the child.

			OK	??	PR
01.	Falls frequently	(24)	☐1	☐2	☐3
02.	Walks carelessly; trips over nothing	(25)	☐1	☐2	☐3
03.	Moves awkwardly, clumsily	(26)	☐1	☐2	☐3
04.	"Keeps time" to rhythm	(27)	☐1	☐2	☐3
05.	Holds pencil correctly	(28)	☐1	☐2	☐3
06.	Writes, prints correctly	(29)	☐1	☐2	☐3
07.	Colors; doesn't just scribble	(30)	☐1	☐2	☐3
08.	Cuts correctly with scissors	(31)	☐1	☐2	☐3
09.	Pastes correctly	(32)	☐1	☐2	☐3
10.	Buttons, unbuttons own clothing	(33)	☐1	☐2	☐3
11.	Ties--shoe laces, hats, etc.	(34)	☐1	☐2	☐3
12.	Copies correctly from chalkboard	(35)	☐1	☐2	☐3
13.	Listens to entire direction before beginning activity	(36)	☐1	☐2	☐3
14.	Follows directions	(37)	☐1	☐2	☐3
15.	Discriminates sounds--beginning, middle, ending	(38)	☐1	☐2	☐3
16.	"Keeps his/her place" in a book	(39)	☐1	☐2	☐3
17.	Has reversals--"saw" for "was," numbers, etc.	(40)	☐1	☐2	☐3
18.	Sees relationships; makes associations	(41)	☐1	☐2	☐3
19.	Classifies; organizes work assignments	(42)	☐1	☐2	☐3
20.	Recognizes sequential order	(43)	☐1	☐2	☐3
21.	Distinguishes between right and left	(44)	☐1	☐2	☐3
22.	Understands relation to space--top/bottom, above/below, etc.	(45)	☐1	☐2	☐3
23.	Seems self-confident (willing to try)	(46)	☐1	☐2	☐3
24.	Appears self-sufficient (not "helpless")	(47)	☐1	☐2	☐3
25	Acts mature (not "babyish")	(48)	☐1	☐2	☐3
26.	Seems shy, withdrawn	(49)	☐1	☐2	☐3
27.	Follows specific directions for placing work on paper	(50)	☐1	☐2	☐3
28.	Disrupts classroom, "acts out"	(51)	☐1	☐2	☐3

NOTE PLEASE COUNT TO BE SURE THAT YOU HAVE MARKED 28--AND ONLY 28--X's (ONE PER ITEM).

TEACHER'S NAME _____ SEX: (Circle.) M F BIRTHDATE _____ (month/day/year)

PLEASE NOTE.

If this child is no longer enrolled in your school, please indicate in the appropriate place below, and return this form with the others from your building.

☐ WITHDREW to _____ ☐ TRANSFERRED to _____

INSTRUCTIONS: Be sure that all information has been provided in each of the spaces above the big box. Then, on the basis of your current observations of the child's typical behavior in your classroom, mark X in one of the boxes to the right of every item, as follows:

PR - if this is a real "problem area" for the child;
?? - if this is sometimes, but seldom, a problem for the child;
OK - if this is now no problem for the child.

		PR	??	OK
01. Falls frequently	(53)	☐1	☐2	☐3
02. Walks carelessly; trips over nothing	(54)	☐1	☐2	☐3
03. Moves awkwardly, clumsily	(55)	☐1	☐2	☐3
04. "Keeps time" to rhythm	(56)	☐1	☐2	☐3
05. Holds pencil correctly	(57)	☐1	☐2	☐3
06. Writes, prints correctly	(58)	☐1	☐2	☐3
07. Colors; doesn't just scribble	(59)	☐1	☐2	☐3
08. Cuts correctly with scissors	(60)	☐1	☐2	☐3
09. Pastes correctly	(61)	☐1	☐2	☐3
10. Buttons, unbuttons own clothing	(62)	☐1	☐2	☐3
11. Ties--shoe laces, hats, etc.	(63)	☐1	☐2	☐3
12. Copies correctly from chalkboard	(64)	☐1	☐2	☐3
13. Listens to entire direction before beginning activity	(65)	☐1	☐2	☐3
14. Follows directions	(66)	☐1	☐2	☐3
15. Discriminates sounds--beginning, middle, ending	(67)	☐1	☐2	☐3
16. "Keeps his/her place" in a book	(68)	☐1	☐2	☐3
17. Has reversals--"saw" for "was," numbers, etc.	(69)	☐1	☐2	☐3
18. Sees relationships; makes associations	(70)	☐1	☐2	☐3
19. Classifies; organizes work assignments	(71)	☐1	☐2	☐3
20. Recognizes sequential order	(72)	☐1	☐2	☐3
21. Distinguishes between right and left	(73)	☐1	☐2	☐3
22. Understands relation to space--top/bottom, above/below, etc.	(74)	☐1	☐2	☐3
23. Seems self-confident (willing to try)	(75)	☐1	☐2	☐3
24. Appears self-sufficient (not "helpless")	(76)	☐1	☐2	☐3
25. Acts mature (not "babyish")	(77)	☐1	☐2	☐3
26. Seems shy, withdrawn	(78)	☐1	☐2	☐3
27. Follows specific directions for placing work on paper	(79)	☐1	☐2	☐3
28. Disrupts classroom, "acts out"	(80)	☐1	☐2	☐3

NOTE PLEASE COUNT TO BE SURE THAT YOU HAVE MARKED 28--AND ONLY 28--X's (ONE PER ITEM).

ATTACHMENT C

PERCEPTUAL-MOTOR DEVELOPMENT PROJECT SCHOOLS

POVERTY INDICES AND MOBILITY RATES

SCHOOL AND MAP CODE	POVERTY INDEX*	MOBILITY RATE**
# 451 P_1	42.6%	104%
# 486 P_2	47.6%	56%
# 560 P_3	40.6%	86%
# 584 P_4	61.4%	67%
# 400 C_1	53.6%	68%
# 500 C_2	30.3%	103%
AVG. ALL ELEM. SCHOOLS (N = 132)	33.8%	61%

* "Cleveland Public Schools Poverty Index: 1977-1978." Cleveland (Ohio) City Schools, Division of Research and Development, June 6, 1977.

** "Pupil Mobility in Cleveland Public Schools: 1975-1976." Cleveland (Ohio) City Schools, Division of Research and Development.